

1887 -2

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SHORT HINTS ON CHEESE-MAKING

AND

TESTS OF SALT IN BUTTER-MAKING.

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ISSUED BY THE ONTARIO DEPARTMENT OF AGRICULTURE,
JUNE, 1887.



Pamph
1887
no. 40

SHORT HINTS ON CHEESE-MAKING.

It is not the purpose of this paper to discuss the science of cheese-making, but to state in a series of simple sentences the best practice for Canadian factorymen. If many of them to the old hand seem superfluous, their advice is none the less needed in a large number of factories.

1. Use every endeavour to educate your patrons how to produce milk of the best quality, with the most profit.
2. Give each one a copy of "Points for the attention of Patrons of Cheese Factories."
3. Carefully inspect the milk cans, especially the seams inside the covers, once every week ; any offensive matter appearing yellow when wet with milk is most dangerous to the flavor and keeping qualities of the cheese.
4. Insist on a careful straining immediately after milking.
5. Send a circular or note to every patron two or three times a year, urging care in the airing of all milk.
6. Visit promptly the farm, pasture, stable, milking-yard, milk-house and milk-stand of every patron whose milk comes tainted after he has been notified of its bad quality ; some apparently trivial matter that has escaped attention will generally be found as the cause.
7. Where whey is returned in the milk cans, urge the owners to empty them as soon as received, and not to feed the whey near a milk stand, milking yard or other place where milk is kept.
8. Examine carefully the inside and outside of the opening from the weighing can into the milk conductor ; and just after using look into the conductor very closely for any traces of the yellow matter referred to in No. 3.
9. Do that every day.
10. Entertain a 'creepy dislike' for the use of a strainer, cloth, dipper, pail or thermometer which feels greasy, or that has a miser's store of matter-out-of-place in the corners.
11. Lift the pans of the milk vats out of their places for a thorough cleaning of the water-pans once a fortnight.
12. 84° or 86° Fahr. are satisfactory setting temperatures when the milk is in good condition.
13. Over-ripe or acidy milk may with advantage be set as high as 96°, according to the degree of its ripeness. See also 26.
14. During October and November the milk, before setting, should be sufficiently ripened by the addition of old milk kept in a pure atmosphere, or by the application of heat to the whole volume of milk some hours previous to putting in the rennet.
15. In the use of coloring, the annatto extract should be diluted to the extent of one gallon of water to every vatful of milk, and then thoroughly stirred in.
16. Pure rennet extract or powder of *known* strength is indispensable.

17. The quantity used should be regulated according to the condition of the milk.
18. The first discernible action of rennet is to coagulate the milk into curd.
19. To perfectly coagulate the milk from fresh calved cows, more rennet is required than later in their milking season.
20. The more rennet there is used, the more moisture will there be retained in the cheese under similar conditions of making.
21. The more moisture there is retained in the cheese the more quickly will it cure under equal conditions of temperature and atmosphere.
22. For quick curing cheese, as much rennet should be used as will thicken for cutting in from fifteen to thirty minutes at a temperature of 86°.
23. For summer and fall cheese forty-five minutes should be allowed for the same process, with milk in good condition.
24. The second evident action of rennet is to effect a separation of moisture by a contraction of the curd particles.
25. The raising of the temperature up to 98° Fahr. provides increasingly favorable conditions, and thus promotes the rennet action.
26. When milk is over-ripe or acidy, a proportionately increased quantity of rennet should be used to effect a sufficient separation of the moisture from the curd (often termed "cooking.") before the presence of lactic acid is perceptible to the taste or smell, or is discernible by the hct iron test. See also 13.
27. Observation of the foregoing would remedy many so-called mushy curds, and avoid the danger of "leakers."
28. Rennet should be diluted to the volume of at least one gallon of liquid for every vat before being added to the milk.
29. It should be thoroughly mixed by vigorous stirring, otherwise coagulation will be very imperfect.
30. The results of late investigations recommend an allowing of the curd to become fairly firm before commencing to cut, except in the case of a quick curd.
31. More moisture is retained in the cheese, and a better yield is thus obtained. See also 21.
32. The horizontal knife should be used first, lengthwise, and then followed by the perpendicular knife, crosswise, after the whey has separated to half cover the curd.
33. The mesh of the knives should be so close that three cuttings would suffice, except in the case of a quick curd, which should be cut unusually fine.
34. The knives should be moved fast enough to prevent much disturbance of the curd by pushing.
35. Gentle and slow stirring should begin immediately after the cutting is completed.
36. The hand should be used to free the sides and bottom of the pan from any curd that may have adhered.
37. The application of heat should be delayed for fifteen minutes after stirring is commenced.

38. The heat should be applied through the medium of warm water to avoid scorching of the curd.
39. The temperature should be gradually raised to 98° Fahr. at a rate not faster than one degree every four or five minutes.
40. In the case of a quick curd, Nos. 37 and 39 may be disregarded.
41. Stirring should be continued till the curd is properly "firmed" or "dried."
42. When the hot iron test shows fine hairs, from $\frac{1}{4}$ to $\frac{1}{8}$ of an inch long, the whey should be removed.
43. If acid be discernible by the hot iron test before the curd is so properly "firmed," the whey should be immediately removed and the stirring continued till that firm condition is brought about.
44. In both cases the dry curd should be kept at a temperature above 92° Fahr.
45. *After the curd is dry or firm enough, but not before, it may be allowed to mat into one mass.*
46. It should be frequently turned and packed close, till the layers of curd are four or five deep.
47. Whey should never be allowed to gather in small pools on the curd at this stage.
48. The conditions of the curd, as to when ready for cutting and salting, are best ascertained by the use of the senses. The usual order of reliability for that purpose is by touch, smell, taste and appearance.
49. The proper degree of change has taken place when the curd feels mellow, velvety and greasy; smells like new-made butter from sour cream; tastes aromatic rather than sour; and shows a texture passing from the flaky or leafy into the stringy and fibrous.
50. When the curd is gasey or very porous, souring should be allowed to go further before it is arrested by the cutting and salting.
51. If the curd be too moist or soft it should be cut or ground at a rather earlier stage, and hand-stirred sometime before the addition of salt.
52. In both of those cases it should also be well aired by stirring before being salted.
53. It is generally beneficial to stir the curd for five or ten minutes after cutting or grinding before the salt is applied.
54. The results of the tests made last season (1886), for the Western Ontario Dairymen's Association, indicate that Canadian salt is better for cheese-making purposes than English salt.
55. One pound and three-quarters of pure salt per 1,000 pounds of milk is a maximum quantity for April and early May cheese.
56. From two pounds to two and three-quarters pounds of salt per 1,000 pounds of milk is the range for summer use on fairly dried curds.
57. Where extra rennet has been used, or where the curd is sloppy, a corresponding increase of salt should be applied.
58. One important action of salt is to dry the curd and cheese, and thus retard the curing.
59. The curd should be hooped and pressure applied within twenty to forty-five minutes after the salt is stirred in.

60. The desirable rosy flavor is lost by delay at this stage.
61. Pressure in the hoops should be continuous, at first light and gradually increasing.
62. The followers should be loose-fitting, and canvas press rings used.
63. Particular care should be taken to use only pure water when turning the cheese for bandaging, before the ends are fully closed.
64. Greasy water is sure to percolate into the body of the cheese and leave nasty flavors.
65. The curd-cutter or grinder must be thoroughly cleaned every day; wretchedly bad flavors are frequently sown in cheese from neglect of this.
66. Curd sinks should be furnished with racks having slats bevelled to an edge from both sides.
67. The racks need thorough scrubbing on both sides every day, and should be turned out for airing over night.
68. A sink cloth that shows clogging by yellow matter should be burned at once.
69. Occasional soaking over night in a strong sal-soda solution is beneficial.
70. The curd whisk has been a fruitful scatterer of bad flavors, a hair brush is more easily kept clean.
71. The hoops and press tables require to be rinsed with hot water every day, and scrubbed on both sides twice a week.
72. All cheese should be turned in the hoops in the morning to give finish to the shape and body.
73. The press cloths should be left on for a fortnight, or till within a few days of the time for shipment.
74. No cheese should be taken to the curing-room till the shape is true and the edges well made.
75. The curing-room floor should be frequently swept, the shelves thoroughly cleaned after each shipment, and the air kept pure by suitable ventilation.
76. The curing is effected by fermentation, while heat up to 70° makes a favorable condition, and cold under 60° an unfavorable condition for its operation.
77. A temperature of from 70° to 75° Fahr. should be maintained for curing spring cheese.
78. From 65° to 70° Fahr. is the best range of temperature for the curing of summer and fall cheese.
79. The cheese should be turned on the shelves once a day till at least three weeks old.
80. When press cloths are stripped off, use warm (but not hot), pure, sweet, flavored grease on the rinds.
81. Just before boxing summer cheese grease them, and apply scaleboards while the grease is still soft.
82. Mark the weight of each cheese in neat figures on the hollow of the side of the box.
83. Let there be two scaleboards on each end of the cheese in the box.

84. The edge of the box should be level with the cheese, and the cover should fit close.
85. The band of the box cover should be at least $\frac{1}{4}$ of an inch thick to give additional strength to the package.
86. Insist on the teamsters using only clean wagon or sleigh boxes in which to take cheese to the railway station.
87. See that the flues of the steam boiler are cleaned out every week.
88. *Finish all of every day's work each day, in the very best way you can.*
89. Keep everything in and about the factory scrupulously clean.
90. Keep a correct and detailed record of every day's make.
91. Occasionally compare the working of your factory in all its details with the foregoing recommendations.
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TESTS OF SALT IN BUTTER-MAKING.

That the influence of salt on the quality of the butter to which it is added is not confined to the imparting of a salt flavor, has long been admitted. A few tests were undertaken during the season of 1886, at the Agricultural College Creamery, from which it was expected that conclusions useful for the guidance of butter-makers could be drawn; but little steady light is thrown by them on the disputed point as to which salt is the best for preserving butter. Many defects in quality, recognized after the lapse of time and which have been attributed to the use of unsuitable salt, will have to be laid at the door of some other condition or cause.

On August 12 several lots of butter were weighed from one churning and salted with salt of as many different brands, at the rate of one ounce per pound of butter.

On August 13 the same was done with the butter from another churning.

On August 15 and 21 two tests were prepared for, in a like manner, with the use of three-quarters of an ounce per pound of butter.

On August 26 and September 3 a rate of half an ounce of salt per pound of butter was applied in the same way.

From four to six lots of butter were weighed from the same churn, on each of these six occasions.

The butter was packed in tin-lined tubs and kept in a cellar where the temperature was purposely made to fluctuate from 40° to 55° Fahr., to try its keeping qualities.

The Canadian makes of salt used were Coleman's, Kidd's, Rice's and Roger's; the English makes used were Ashton's and Higgins'.

At the convention of the Ontario Creameries Association held in Toronto in March, 1887, F. W. Fearman, Esq., Hamilton, James

Park, Esq., Toronto, and Thomas Johnstone, Esq., Toronto, were appointed a Committee of Examination. The judging was deferred till 22nd and 28th March. The different lots were known to the judges by numbers only, there being no indication on the tubs as to the kind or quantity of salt used. The object of the judging was, to arrange in the order of their merit the different tubs in each lot from the one churning.

There was the widest difference of opinion in some cases among the judges as to the relative merits of the different tubs in the same lot. Some butter salted with every one of the different brands of salt was awarded by merit the first place in at least one of the several comparisons. No one kind showed such superiority over the others, on the average of the tests, as to deserve special mention. The average merit of the Canadian salt was slightly higher than that of the English, but the average loss of weight by the addition of salt and working was slightly in favor of the English article.

In a comparison as to the qualities of the butter from using different quantities of the same salt in several lots from one churning at the end of six months, the butter salted three-quarters of an ounce to the pound was placed first; one ounce to the pound second; one-half ounce to the pound third; one and a quarter ounces to the pound fourth; one-quarter of an ounce to the pound last and very inferior.

In cases where the salt was slow of dissolving and where the butter had been left without the addition of fresh brine, the resultant porosity of body caused it to go off in flavor.

Contact between the salt-plaster and the wood of the tub covers seem to convey and impart a woody flavor to the top of the butter.

I would recommend—

I. The use of pure, clean salt of as nearly as possible uniform sized grains, which dissolve readily and completely before the butter is worked the second time.

II. The use of a parchment or parafine paper covering on the top of the salt-plaster.

III. Attention to the frequent brining of the tubs to replace the moisture removed by evaporation.

IV. Care in keeping the temperature of the store room steady.